

## SITE CHARACTERISTICS

The physical features of Hamilton County have exerted a strong influence on urbanization in the past. The rivers and their valleys historically have been the channels through which water and land bound transportation systems have been developed. The flat open valley floors attracted the first settlers who started the urbanizing process. Hidden valleys of prehistoric rivers are the source of an underground water supply which has contributed to the location of industry. The steepness of slope, the rapidity of runoff of storm water and the porosity of ground have each influenced the urban pattern. These features will continue to control and limit the economic adaptation of the county area for urban use in the future.

### Topography

Hamilton County is a part of an upland plain rising some 900 feet above sea level. All of the area drains to the Ohio River and its tributaries. The Ohio crosses the area in a deep valley some 400 feet below the general level of the plateau. The Ohio is joined by the two Miami's from the north to form the main elements of the drainage system.

Near the larger streams the land is hilly, made so by numerous tributary streams of 10 miles or more in length to mere ravines. As a rule, there is little flat upland between these smaller valleys. In the broad interstream spaces, back a few miles from the large valleys, the tributary valleys are fewer and not so deep, and there are broad, nearly flat uplands such as those at Mt. Healthy and Blue Ash.

The most striking topographic features of the area are the extremely wide valleys and the relatively small streams that flow through them. The major valleys are broad, flat-bottomed depressions flanked on either side by relatively steep bluffs rising from 200 to 400 above the general level of the valley floors. These broad valleys are the remnants of an earlier drainage system which existed prior to Pleistocene glaciation, and following that event they were partially filled with glacial drift. In some places the present streams, such as the Miami River, the Little Miami River and Mill Creek, are flowing in these depressions but at much higher elevations than the original streams. Some of the old valleys, such as the Norwood Trough, are almost completely abandoned as waterways. (1)

(1) "Ground Water Conditions in Butler and Hamilton Counties, Ohio". 1946 Bulletin 8, State of Ohio, Department of National Resources, Division of Water.

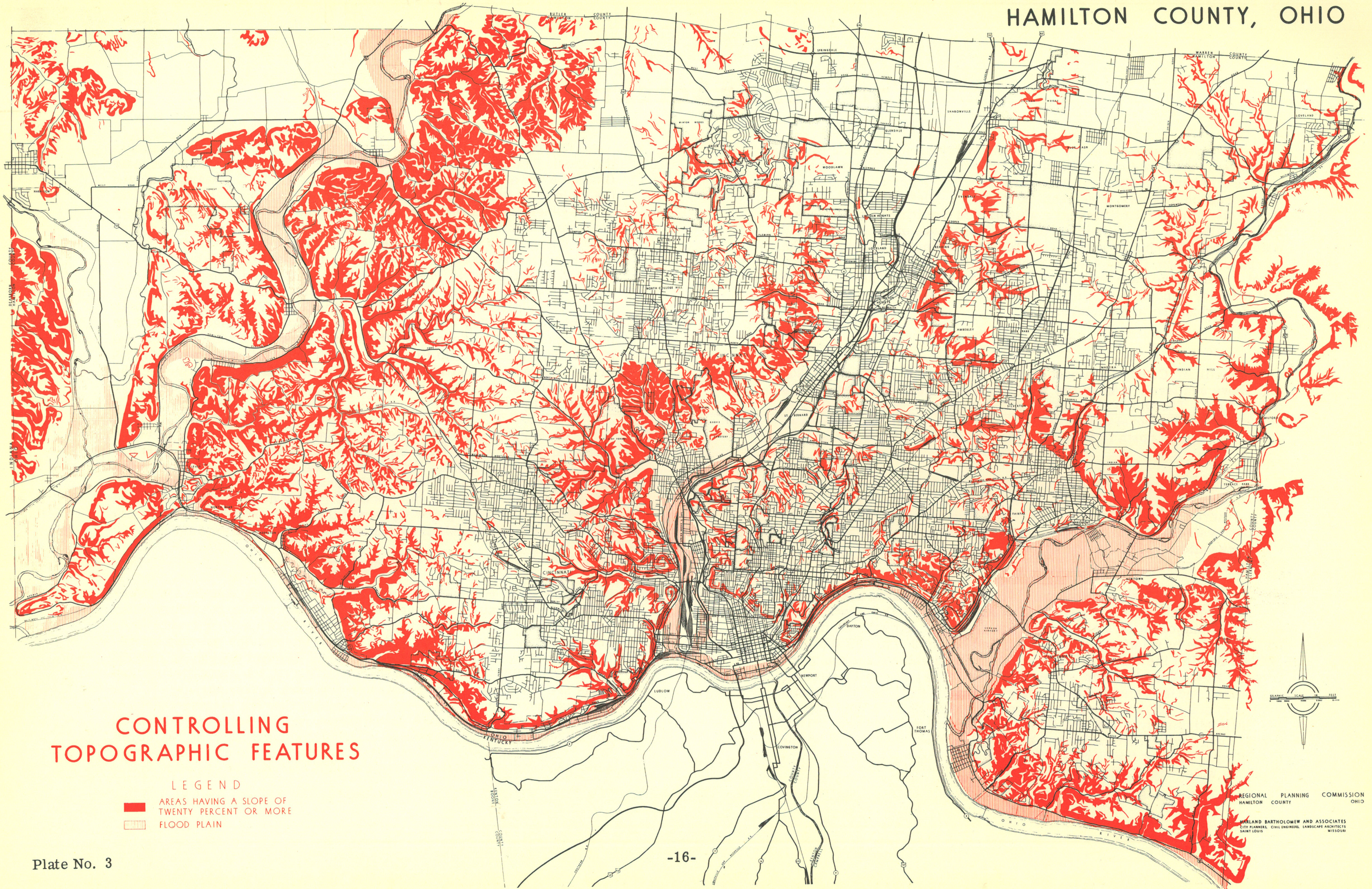
Geological evidence indicates three major preglacial streams in the area. The present primary stream, the Ohio River, from the east flowed northward through part of what is now the Little Miami Valley to the vicinity of Red Bank, where it was joined by the Little Miami, and thence generally westward through the Norwood Trough to approximately the present Elmwood Place. There it merged with the Licking River which entered the area from the south, and together these streams flowed northward through the present basin of the Mill Creek Valley to a junction with the Great Miami River south of Hamilton. From this point, the main stream took a southwesterly course through the New Haven Trough into the present Whitewater River Valley and thence into the Ohio River Valley near Lawrenceburg. Following glaciation and the blocking of the old channel south of the Norwood Trough by ice and glacial deposits, the Ohio River cut a new course following generally its present alignment, and the old waterway in the Mill Creek Valley became a relatively small stream and reversed its direction southward into the present Ohio River.

The significance of these preglacial valleys lies in the fact that the older valley walls have been more completely eroded. This has created a less precipitous slope between the valley floor and the upland in some places providing land more readily adaptable to urban uses. The Mill Creek Valley and the Norwood Trough are examples. This is in contrast to the sharp new valleys of the Ohio, the Little Miami near Milford and the Great Miami from New Baltimore to New Haven.

### Steep Slopes

The most rugged land in the county lies adjacent to the newer valleys created since the period of glaciation. In a relatively short period of time, these rivers and their tributaries have cut down to their present depth. The tributaries are usually intermittent streams extending one to three miles back into the plain. The drainage system is incomplete making a multitude of sharply serrated, narrow valleys whose walls are steep and largely unusable for most urban purposes. The most extensive areas of rugged land forms follow the present course of the primary rivers. Plate 3 shows those areas of the county where the ground has a slope 20 percent or more. These represent 56,000 acres, 21 percent of the area of the county. At the present time, urban land uses have utilized about one-eighth of this "20 percent slope" area. A





## CONTROLLING TOPOGRAPHIC FEATURES

### LEGEND

- AREAS HAVING A SLOPE OF TWENTY PERCENT OR MORE
- FLOOD PLAIN



greater effort was made to utilize this kind of land in the days of the inclined-plane railroad than since. With the mobility afforded by the automobile, it is now by-passed in favor of better-suited land located farther out.

#### Flood Plains

Approximately 22,000 acres or eight percent of the county area is within a flood plain that is subject to fairly frequent flooding. (See Plate 3.) The areas shown are those which, according to the records of the county engineer, were inundated by the floods of 1913, 1933, 1937 and 1959. The effect of flooding on urban development has been somewhat modified by flood control units installed in the Great Miami Basin, along the Ohio and in the Mill Creek Basin. Notwithstanding, major storms continue to cause damage to development in the flood plains. Recent examples are the damage in 1959 to parts of the Mill Creek Basin and the damage caused generally by the 1964 flood.

#### Ground Water Resources

The preglacial river valleys previously described are filled with a glacial till to varying depths of from 200 to 400 feet. These glacial deposits are intermittent layers of sand, sand and gravel, and clay. Most of the deposits were subject to a washing action making a large proportion of them permeable. Hence, dependable ground water supplies are obtained. Before pumpage of the buried valleys, the ground reservoirs were filled to over-flowing and water existed in many areas under artesian conditions. Heavy pumpage of some of the valleys such as the Norwood Trough and the Mill Creek Basin has substantially lowered the water table. Excessive pumpage by the suburban communities and industries depleted the ground water and a supplemental supply has been required. Industries in the area now secure water from the Miami River Basin. There is presently little pumpage in the Lower Miami Valley, or in the Whitewater Valley. Both appear to be potential sources of significant ground water supplies.

Recharge to the glacial deposits filling the buried valleys is received from direct precipitation and from flood waters of streams traversing these deposits. Preservation of the flood plain and its utility as the temporary storage for flood water is a requirement of an adequate ground water supply.

#### Drainage

The county is divided naturally into four primary drainage systems, all being tributary to the Ohio River. These are: the Mill Creek Basin, the Great Miami River Basin, the Little Miami River Basin, and the area tributary directly to the Ohio. Parts of all of these systems except the Great Miami are included within the Metropolitan Sewer District. Only one major sector of the county is tributary to major or minor streams outside the county boundary. This is the area tributary to Pleasant Run in North Springfield and Colerain Townships.

The Mill Creek Basin. The basin covers most of the central part of the county from Cheviot and Pippin Roads on the west to Montgomery and Plainfield on the east. This is the most intensively developed of the four primary systems. It includes much of the City of Cincinnati and several suburban communities. All of the Mill Creek Basin in Hamilton County is in the Metropolitan Sewer District. Flood protection works are installed on the West Fork and a Conservancy District has been formed to alleviate further flood problems.

The Great Miami River Basin. This basin includes the area of the county west of the Mill Creek Drainage System. The basin is divided into a number of tributary areas the most important of which are the Watersheds, the Whitewater River, Dry Fork Creek, Taylor Creek, and Blue Rock-Owl-Dunlap Creeks. Flooding is frequent in the primary river valleys. There are no protective works in the general area, but the Miami Conservancy District has made improvements in the headwaters.

The Little Miami River Basin. This basin drains the area east of Montgomery and Plainfield Roads, including most of Anderson Township. The basin is divided into several important watersheds. Duck Creek and Clough Creek Watersheds are within the Metropolitan Sewer District. Sycamore Creek, Polk Run and Dry Run are all tributary to the Little Miami upstream from Newtown. There are no flood protection works in this basin except for purely local protection such as at Lunken Airport. Flood waters frequently cover the lower valley.

Ohio River Tributaries. To the west of Mill Creek, Delhi and a part of Green Township drains to the Ohio via Rapid Run, Muddy Creek and Fiddler's Green. The first two watersheds are in the Metropolitan

Sewer District. Three, Four, Five and Eight Mile Creeks in Anderson Township drain four small basins covering the area south of Salem-Beechmont from California to the county line.

#### Soil Characteristics

The exposed bluffs and the bed rock formation in Hamilton County consist of alternate layers of shale and limestone. These are extremely dense and essentially impervious. For the most part, these bedrocks have been overlain by a glacial till which is an intimate mixture of rock materials, chiefly clay and varying amounts of sand, pebbles, boulders and rock fragments. On the whole, this is too compact to yield or absorb appreciable amounts of water.

COLERAIN AVENUE - MT. AIRY FOREST

